Guar Research Efforts at Clovis, NM

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Outline

- Introduction
- Previous Research
- Future Plan
Alternative Crops

Water Use

Months

Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec

Conventional Crop

Alternative Crops
First Guar Project: Deficit Irrigation Management 2013

Herbicide drift damaged the trial.
Second Guar Project:
Seeding Date Study 2014-15

- Matador
- Lewis
- Kinman
- HES 1123
- June 18
- July 6/7
- July 20/22

Sudhir Singla, MS Student
Figure 2.1 Effect of different planting dates on leaf area index and chlorophyll content of various guar genotypes at 50% flowering stage at Clovis, NM in 2014.

Values with the same letter within one variable are not statistically different according to Fisher’s LSD test at $\alpha = 0.05$. 
Figure 2.2 Effect of different planting dates on photosynthetic rate and stomatal conductance of various guar genotypes at 50% flowering stage at Clovis, NM in 2014.

Values with the same letter within one variable are not statistically different according to Fisher’s LSD test at α = 0.05
Results: dry biomass

Clovis, 2014

Figure 2.3 Effect of different planting dates on above ground dry biomass of various guar genotypes at 3 growth stages at Clovis, NM in 2014.

Values with the same letter within a growth stage are not statistically different according to Fisher’s LSD test at $\alpha = 0.05$. 
Table 2.4 Effect of different planting dates on pod thickness, seeds per plant, clusters per plant, pods per plant, harvest index and seed yield of various guar genotypes at maturity at Clovis, NM in 2014.

<table>
<thead>
<tr>
<th>Planting Date</th>
<th>Pod thickness (mm)</th>
<th>seeds per plant</th>
<th>Clusters per plant</th>
<th>Pods per plant</th>
<th>1000 seed weight (g)</th>
<th>Harvest index</th>
<th>Seed yield (kg ha(^{-1}))</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 June</td>
<td>3.8a</td>
<td>329.3a</td>
<td>13.7a</td>
<td>62.7a</td>
<td>30.7a</td>
<td>0.35a</td>
<td>1399a</td>
</tr>
<tr>
<td>7 July</td>
<td>2.4b</td>
<td>213.5b</td>
<td>11.1b</td>
<td>43.3b</td>
<td>21.8b</td>
<td>0.31ab</td>
<td>1111b</td>
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<tr>
<td>22 July</td>
<td>1.4c</td>
<td>57.2c</td>
<td>7.5c</td>
<td>28.2b</td>
<td>18.9b</td>
<td>0.26b</td>
<td>903b</td>
</tr>
</tbody>
</table>

Genotype

| HES 1123      | 2.2b              | 231.4a         | 12.0a             | 46.3a          | 22.0b               | 0.32ab        | 1128a           |
| Kinman        | 2.5b              | 129.0b         | 7.8b              | 34.9a          | 20.4b               | 0.29b         | 1144a           |
| Lewis         | 3.0a              | 231.7a         | 11.5a             | 49.3a          | 22.2b               | 0.33a         | 1162a           |
| Matador       | 2.5b              | 207.9a         | 11.7a             | 48.5a          | 30.6a               | 0.29b         | 1117a           |

Planting Date × Genotype

| NS            | NS                | NS               | NS                | NS             | NS                 | NS             | NS              |

† Values with the same letter within a column are not statistically different according to Fisher’s LSD test at α = 0.05

NS - Non-significant at \( P \leq 0.05 \)
Hailstorm Damage at Clovis

• Ruined first two plantings on June 16, 2014
Summary

- Optimum planting dates for guar was around middle of June in the area.
- Seed yield of guar starts declining with delay in planting.
- More research on earlier than June middle planting are required.
Future Plans
When to Plant

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<tr>
<th>Month</th>
<th>Temperature (°F)</th>
<th>Rainfall (in)</th>
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Guar: Deficit Irrigation Management
- Deep root system
- Water Extraction Patterns
- Biomass partitioning
- Yield formation
Water Extraction and Yield Formation
Water Extraction

(Winter Canola & Wheat)

Soil Moisture Content (m$^3$ m$^{-3}$)

Soil depth (cm)

0 mm

150 mm

300 mm

(Clovis, 2009)
Deep Rooted Crops: Irrigation Management

- Critical growth stages approach
Effect on Seed Quality
Temperature Extremes: Cold!!!

Thank you

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